44-7 - Booth No. 204: A SYNOPTIC SURVEY OF SPRINGS IN THE DRIFTLESS AREA OF MINNESOTA TO IDENTIFY THE ROLE OF STRATIGRAPHIC AND TOPOGRAPHIC POSITION IN GROUNDWATER QUALITY

Sunday, September 22, 2024

8:00 AM - 5:30 PM

Hall D (Anaheim Convention Center)

Booth No. 204

Abstract

The Driftless Area is a topographically distinct region of the Upper Midwest lacking the thick cover of glacial deposits typical of surrounding areas. Gently dipping layers of Paleozoic sedimentary bedrock are widely exposed at the land surface, with alternating clastic aquifers, carbonate aquifers, and fine-grained aquitards, all cut by systematic regional jointing and incised topography. Well-developed karst systems feed numerous springs and coldwater streams, but also make the region highly vulnerable to groundwater contamination from extensive agricultural activity.

As part of a Keck Geology Consortium REU program, undergraduate students will survey approximately fifty springs across the Minnesotan part of the Driftless Area over a three-week period in August 2024, creating a snapshot in time of late-summer baseflow conditions. At each spring, we will record discharge, temperature, pH, electrical conductivity, dissolved oxygen, and nitrate concentration. We will also sample a subset of springs for stable isotopes.

We will use these data to determine the relationship between spring stratigraphic and topographic position and the basic water physical and chemical parameters collected in-situ. Our initial hypothesis is that the primary determinant of spring water quality is the average age of groundwater emerging from the spring, with land use practices within the springshed having a larger impact in springs with younger groundwater ages, and stratigraphic and topographic position playing a minor role. This idea has been put forward in existing literature, but has not been systematically tested.

Geological Society of America Abstracts with Programs. Vol. 56, No. 5, 2024
doi: 10.1130/abs/2024AM-401921

Author

F

Chloe Fandel
Carleton College

Authors

G

Augusta Gruhlke
Carleton College

A

Pilar Andruet
Carleton College

C

Edwyn Choi
Amherst College

E

Zachary Embacher
St. Norbert College

J

Alicia June
William & Mary

S

Mikell Schoonover
Minnesota North - Vermilion

View Related